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ORIGINAL PAPER

"A DOCTOR IN THE DEPARTMENT"*

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If the specialty of physical medicine is to develop and expand, those engaged in its practice must be prepared to meet and to refute hostile criticism. It is with this in mind that I have attempted to assess some of the improvements in the hospital service which may be expected to follow the appointment of a physical medicine specialist in any area, and to consider some of the difficulties encountered in the practice of the specialty.

FUNCTIONS OF A PHYSICAL MEDICINE CONSULTANT

The functions of a physical medicine consultant in a general hospital may be divided into four broad groups: (1) accurate diagnosis of skeleto-muscular disorders; (2) supervision of the medical treatment of patients attending the department and of in-patients under his care; (3) supervision of treatments in the department and control of the physiotherapy services; and (4) miscellaneous duties which may include electrodiagnosis, research, undergraduate and post-graduate teaching, administrative duties, and the important task of keeping up to date with recent advances in his field. The greater part of this work is not, by its nature, subject to any statistical assessment.

The importance of training in general medicine has been sufficiently stressed in recent years. Much emphasis has also been laid on the importance of ensuring that consultants in the specialty are not regarded merely as medical officers in charge of physiotherapy departments, but as consultant physicians

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with special knowledge of the diagnosis and management of skeleto-muscular disorders. It follows that all departments should be "open"—that is to say, that all consultants should be in a position to see cases referred directly to them by family doctors. This approach has undoubtedly enhanced the status of physical medicine as a specialty. Great advances have been made since the end of the war, and continued expansion is envisaged during the next ten years.

STAFFING UNDER THE N.H.S.

It may be of interest to review briefly the present staffing of the specialty in the National Health Service. There are 32 whole-time consultants and senior hospital medical officers in the service, with 181 part-time consultants and 31 part-time senior hospital medical officers. Each of these part-time appointments may vary from one to nine weekly sessions, but a study of the total number of sessional hours worked shows that they are equivalent to approximately 42 maximum part-time consultant appointments and 11 maximum part-time senior hospital medical officer appointments. There is thus altogether a total of 85 whole-time or maximum part-time consultant and senior hospital medical officer appointments. In addition there are 10 senior registrar and 20 registrar appointments.

As a result of this establishment of trained specialists I feel sure that we can justly claim that the quality of medical care available to a large group of patients attending physical medicine departments has greatly improved—if only because of the special interest taken in their problems. I do not believe that this work can be adequately carried out by consultants whose main interest lies elsewhere, and who, in any case, are already fully occupied by work in other branches of medicine and surgery.

SUPERVISION OF PHYSIOTHERAPY SERVICES

At this stage I wish to turn to the important part of our duties in connexion with the supervision of physiotherapy and control of the physiotherapy services. Differing conditions of work in different districts make any statistical evaluation of this part of our work very difficult. However, I have selected five hospitals, more or less at random, but each designed to typify various methods of running the service. I cannot claim to have reached any startling conclusions, but I suggest that the figures given in the accompanying tables at least show certain trends. The period under review covers the three years 1954, 1955, and 1956. I have obtained figures relating to physiotherapy treatments and out-patient clinics from the five hospitals concerned, which are labelled A, B, C, D, and E. In each case the figures for 1954 are taken as 100% for comparative purposes.

HOSPITAL A

A teaching hospital fully staffed medically and employing the equivalent of 18 full-time physiotherapists on out-patient work. A total of 23 out-patient clinics are carried out each week.

HOSPITAL A: OUT-PATIENT ATTENDANCES IN PHYSIOTHERAPY DEPARTMENT

	1954		1955		1956	
	No.	%	No.	%	No.	%
New patients	4,913	100	4,302	87·5	3,956	81·5
Attendances	163,400	100	139,608	85·5	171,897	105·0
Units:						
Individual	*165,481*		*152,517*		*168,502*	
Group	*61,327*		*50,426*		*55,951*	
Total units	226,808	100	202,933	90·0	224,453	99·0
Clinics:						
New patients	1,859		2,594		1,877	
Total attendances ..	9,830	100	10,994	112·0	10,956	111·5

Comments.—Approximately half the patients attending for treatment are sent from other hospital departments. In spite of a rise of 11·5% in total out-patient attendances between 1954 and 1956, there has been a fall of 18·5% in the number of cases referred from clinics for physiotherapy over the same period.

HOSPITAL B

A provincial hospital with a staff including a part-time physical medicine consultant and a part-time S.H.M.O., with the equivalent of five full-time physiotherapists and one half-time physiotherapist employed on out-patient work; 11 out-patient clinics are carried out each week.

HOSPITAL B: OUT-PATIENT ATTENDANCES IN PHYSIOTHERAPY DEPARTMENT

	1954		1955		1956	
	No.	%	No.	%	No.	%
New patients	1,248	100	1,324	106·5	1,426	114·5
Attendances	29,768	100	29,253	97·5	30,560	101·0
Units:						
Individual	*26,485*		*25,413*		*25,939*	
Group	*11,962*		*11,428*		*13,118*	
Total units	38,447	100	36,841	93·5	39,057	101·5
Clinics:						
New patients	1,525		1,595		2,265	
Total attendances ..	29,771	100	29,524	99·0	36,704	123·5

Comments.—This hospital serves an area in which the population has been increasing rapidly during the past few years owing to the development of several new housing estates. In spite of a rise of 23·5% in total attendances at clinics (with an increase of 740 new patients) over the period, the total units of treatment ordered have risen by only 1·5%.

Hospitals C and D

Two provincial hospitals in the same area, employing seven and five physiotherapists respectively on out-patient work. A physical medicine consultant took up his duties in the area at the beginning of 1955 and now carries out two out-patient clinics a week at each hospital. Previously cases were referred for treatment from other hospital departments.

Hospital C: Out-patient Attendances in Physiotherapy Department

	1954		1955		1956	
	No.	%	No.	%	No.	%
New patients	2,160	100	1,743	80·5	1,867	86·5
Attendances	31,612	100	25,242	80·5	25,865	81·5
Units:						
Individual	*31,491*		*30,516*		*30,892*	
Group	*8,311*		*5,054*		*4,049*	
Total units	39,802	100	35,570	89·5	34,941	88·0
Clinics:						
New patients	—		323		416	
Total attendances	—		1,018	100·0	1,253	123·0

Comments.—Since the new consultant took up his duties there has been a fall of 13·5% in the number of patients referred for treatment and a fall of 12% in the total units of treatment ordered. This is significant, especially as the orthopaedic unit is at Hospital D in the same area, and therefore a high proportion of cases are under the care of the physical medicine consultant.

Hospital D: Out-patient Attendances in Physiotherapy Department

	1954		1955		1956	
	No.	%	No.	%	No.	%
New patients	2,127	100	2,390	112·5	2,424	114·0
Attendances	14,156	100	14,162	100·5	16,034	113·0
Units:						
Individual	*14,861*		*14,216*		*16,293*	
Group	*154*		*1,612*		*2,245*	
Total units	15,015	100	15,828	105·0	18,538	122·5
Clinics:						
New patients	—		356		389	
Total attendances	—		1,049	100·0	1,177	112·0

Comments.—This hospital department forms the main centre for the physiotherapy work of the orthopaedic unit, and only a minority of cases are seen by the physical medicine consultant. There has been a rise of 12% in clinic attendances between 1955 and 1956, with no corresponding increase in patients sent for treatment. However, the most obvious change over the period is a marked increase in the number of group treatments.

HOSPITAL E

A provincial hospital employing five full-time physiotherapists on out-patient work. No physical medicine consultant is appointed in the area. There are two physiotherapy departments at two wings of the hospital and most cases are referred from out-patient clinics, although a physician holds a "follow-up" clinic each week in the department. In 1956 100 geriatric cases were seen in a separate clinic.

HOSPITAL E: OUT-PATIENT ATTENDANCES IN PHYSIOTHERAPY DEPARTMENT

	1954		1955		1956	
	No.	%	No.	%	No.	%
New patients	3,038	100	3,132	104·0	2,942	98·5
Attendances	34,739	100	34,163	101·0	34,482	99·5
Units:						
Individual	*33,207*		*33,317*		*32,631*	
Group	*7,073*		*7,991*		*7,820*	
Total units	40,280	100	41,308	102·0	40,451	102·0
Clinic attendances	582	100	608	104·5	616	106·0

Comments.—The figures in all categories have remained remarkably constant throughout the period. The superintendent physiotherapist is in constant touch with the consultants: "Views and comments of the physiotherapists are conveyed by word of mouth or in writing to the respective doctors, and we like to think some heed is taken of these views." It may be of interest to compare Hospital C, where, after the appointment of a consultant, total units of treatment (39,802 in 1954) fell by approximately 12% to 34,941 over the period.

HOSPITALS A AND B: IN-PATIENT ATTENDANCES IN PHYSIOTHERAPY DEPARTMENTS

	Hospital A			Hospital B		
	1954	1955	1956	1954	1955	1956
New patients	2,024	1,685	1,803	1,110	1,747	1,782
Total attendances	85,566	77,425	100,781	20,364	26,743	28,082

This inquiry has been mainly concerned with out-patient work, but there has been a very marked increase in the demand for in-patient work in recent years. This is illustrated by the figures for in-patient attendances over the three years at Hospitals A and B (see Table). Between 1954 and 1956 attendances have risen by approximately 17·5% at Hospital A and by approximately 38% at Hospital B.

It would be rash to suggest that the figures given here could form the basis for any exact assessment of the work of medical staff or physiotherapists. Quantity must always be related to quality—and it has often been observed that statistics can be made to prove almost anything. A further difficulty arises in that the effect of a waiting list for clinics or treatment may have some influence on the numbers over the year.

In spite of all this it would not seem unreasonable to claim that a definite trend is discernible; briefly one may conclude that a strong probability exists that the establishment of clinics run by specialists in physical medicine lightens the work of the physiotherapy staff. This reduction of work is effected partly by a reduction in the number of patients sent for treatment from clinics, partly by a reduction in the number of attendances for treatment, and partly by emphasis on active co-operation by patients which results in group exercises increasing while individual treatments decline.

One may tentatively assess the reduction of work achieved by these means as between 10 and 15%. In other words, I suggest that if the same cases were seen in other hospital clinics 10–15% more physiotherapy would be carried out. In considering saving of physiotherapists' time the question of the proper design of departments is of no small importance; and it may not be out of place to mention the saving in running costs and hospital transport which results from any reduction in attendances for physiotherapy.

Space does not permit any detailed study of in-patient work, but it is certain that considerable economies could often be made here without loss of efficiency, and in particular it might be possible to reduce the amount of work done by physiotherapists if the nursing staff were instructed how to carry out simple procedures.

SHORTAGE OF PHYSIOTHERAPISTS

The Secretary of the Chartered Society of Physiotherapy has been kind enough to supply some recent figures which are of considerable interest. These are taken from a return made by the Society to the Ministry of Health in January, 1957.

Thirty-two Hospital Management Committees and individual hospitals are listed as having a permanent shortage of physiotherapists.

In 1955 the Society's *Journal* carried 1,929 advertisements for physiotherapists, 407 of them advertising more than one vacancy; in 1956 the corresponding figures were 2,139 and 459.

Vacancies registered with the Appointments Bureau and the number filled are as follows:

	July–December inclusive		
	1954	1955	1956
Vacancies registered	288	495	597
No. filled	110	114	106

Ten hospitals have recently applied to become training schools for physiotherapists. The number of vacancies for trainees at the nineteen existing training schools were:

1955		1956	
Spring	Autumn	Spring	Autumn
40	53	43	82

In 1954, 4,837 physiotherapists were employed by the National Health Service in the British Isles.

Need for Economy

The vacancies advertised in the Society's *Journal* and registered at the Bureau by no means cover all the existing vacancies in the country, but the figures serve to illustrate the fact that the staffing position is deteriorating year by year and underline the need for economy in the use of existing services. On the basis of the above figures it would appear that a reduction of 10% in the demand for physiotherapy services would radically change the situation for the better. It might be argued that economy in the use of the physiotherapy services can be achieved only by brutal curtailment of treatment to the detriment of patients. But I do not believe that this is so, and in fact I feel sure that in many areas it would be possible to achieve considerable economies and at the same time improve the all-round medical care and management of cases attending physical medicine departments.

These objectives are much more likely to be reached in areas where a physical medicine specialist controls the work, and it is worth considering briefly the methods used. Vague catch-phrases such as "streamlining" or "cutting away dead wood" are not of much help in dealing with individual cases. Our approach may be examined under four headings.

1. Examination of New Patients

Few will disagree that adequate time must be allocated for a full examination of all new patients, but there is a tendency at certain hospitals to overload out-patient clinics. This is false economy. We are but human, and when we are harried and rushed our reaction may be to order palliative treatment (the equivalent of the G.P.'s bottle of medicine) and see the case again in a few weeks. All, then, will no doubt agree that time spent at the initial examination is well spent. It minimizes the chances of diagnostic errors; it allows an opinion to be formed of all relevant factors in each case and makes it possible to decide whether physiotherapy is or is not desirable.

2. Psychogenic Rheumatism

When psychogenic rheumatism is diagnosed and organic disease has been definitely excluded physiotherapy is nearly always contraindicated, as it only serves to fix the idea in the patient's mind that his symptoms are due to some organic lesion—fibrositis, neuralgia, or some such label being attached. Even more important is the assessment of the psychogenic element which is an essential part of the clinical picture of all chronic rheumatic diseases, and which must be taken into consideration when judging the results of therapeutic agents.

3. New Techniques and Treatments

The introduction of new techniques and modern therapeutic agents has effected a significant saving of physiotherapists' time, and in this connexion the widespread use of hydrocortisone injections will readily come to mind.

4. The Aims of Treatment

Finally, it is of great importance that we should always keep our objectives clearly in mind when ordering physiotherapy. When treatment is designed to achieve a specific result—to increase muscle power, to mobilize a joint, or to prevent wasting in temporarily paralysed muscles—frequent attendances are generally necessary and we must be prepared to continue treatment till the best possible result is achieved. On the other hand, when treatment is palliative or is used for the temporary relief of pain, some form of rationing must be applied. I do not deny the value of such treatment, especially in acute self-limiting conditions; but when dealing with chronic rheumatic or neurological disorders we must make it clear that continuous physiotherapy is neither desirable nor possible. This is where rehabilitation services are of great importance. The quota of supportive physiotherapy in a department has to be adjusted to allow adequate time to deal with cases requiring specific remedial treatment.

Assessment at fairly frequent intervals of patients attending for treatment plays a prominent part in reducing the number of ineffective or unnecessary treatments, and such assessment is much more easily arranged when a physical medicine specialist works in the department.

CONCLUSION AND SUMMARY

I am aware that this paper is inadequate in many respects, but the subject is not one that can easily be dealt with in such short compass. Also I have to admit that in the past I myself have often failed to take the advice which I have here outlined. Nevertheless I will have achieved my purpose if I have succeeded in drawing attention to the urgent need for economy in the use of the physiotherapy service, not only by physical medicine specialists themselves, but by all hospital staff using the service.

I have tried to indicate that our work as specialists in physical medicine tends to decrease rather than to increase the strain on the physiotherapy services of the country, and at the same time increases the quality of medical care available to patients attending physical medicine departments. I have also suggested that it might be possible to effect considerable economies in some areas without hardship to patients, although at the present time we can only hope to maintain the service at maximum efficiency by ruthless elimination of "luxury" physiotherapy.

ACKNOWLEDGMENTS

I would like to express my sincere thanks for the help and encouragement of various members of the staffs of the five hospitals concerned in this inquiry, without which this paper could not have been written.

ORIGINAL PAPER

UNTOWARD EFFECTS FOLLOWING LOCAL HYDROCORTISONE INJECTION

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THE technique of intra-articular and peri-articular injection of hydrocortisone, first introduced by Hollander *et al.* in 1951, has now been widely accepted and is used throughout the world by practitioners engaged in the treatment of disorders of the locomotor system.

Because it exerts powerful local action and does not appear to give rise to any general hormonal effects, hydrocortisone by local injection has proved of great value in the treatment of isolated joint and soft-tissue disease. There has, however, been one report of untoward side-effects following its use. Hollander *et al.* (1951) described several minor reactions that they had observed, but apart from this no other work on this aspect of hydrocortisone therapy has been published. It was therefore thought that it would be useful to report the undesirable consequences of the use of hydrocortisone in a series of 2,256 consecutive cases given a total of 6,700 injections. The injections were given between March, 1954, and March, 1957, either to out-patients in the department of physical medicine or to in-patients by the house-physicians as part of general rehabilitation directly under the supervision of the department. The reactions are classified in the accompanying table.

SIDE-EFFECTS FOLLOWING 6,700 HYDROCORTISONE INJECTIONS IN 2,256 PATIENTS

Nature of Reaction	No. of Cases	%
Allergic:		
Urticaria	8	0·12
Bronchospasm	1	0·015
Haemorrhagic:		
Purpura	4	0·06
Haematemesis	2	0·03
Melaena	1	0·015
Nausea and vertigo	18	0·27
Local urticaria	11	0·16
Local weakness	24	0·36
Local sepsis	4	0·06
Total	73	1·09

As reported earlier (Crisp and Kendall, 1955), it is the frequent practice at this hospital to inject 2% procaine or hyaluronidase along with the hydrocortisone, and this has been taken into account when analysing the results, as both these agents are potentially capable of producing side-effects.

GENERAL EFFECTS

ALLERGIC REACTIONS

Urticaria.—Generalized urticaria occurred in eight patients following injection. The time range for the first appearance of the wheals varied from 30 minutes to 8 hours, and the longest duration of the lesions before spontaneous disappearance was 36 hours in an untreated case. Seven out of the eight patients were treated with oral administration of antihistamines and made a rapid and satisfactory response. In three of the cases in this group 2% procaine and 1,000 units of hyaluronidase had been injected simultaneously with the hydrocortisone.

Bronchospasm.—One of the patients (a male aged 48) suffered a violent attack of bronchospasm within 45 minutes of the injection; he also developed a widespread urticaria. He had a known allergic and asthmatic history, but had had no recent attacks. He rapidly developed oedema of the face and larynx, but this responded satisfactorily to adrenaline and ephedrine. After 24 hours' bed rest under observation he made a full recovery. It is to be noted that in this case also a combined injection of hydrocortisone with 2% procaine and 1,000 units of hyaluronidase was given.

HAEMORRHAGIC REACTIONS

Purpura.—In four of the cases generalized purpura developed, in all of them within 24 hours of local injection of hydrocortisone. Three of the patients had had an injection of hydrocortisone alone, and one a combined injection including hyaluronidase. In the last case a generalized arthralgia developed with effusions into both knee-joints, and also facial and laryngeal oedema. This patient responded to bed rest alone and within 24 hours had become symptom-free. In none of the patients suffering from purpura was there a reduction in platelet count or prolongation of the bleeding time.

Gastro-intestinal Bleeding.—Two cases of haematemesis occurred within 48 hours of the injection of hydrocortisone. In one of these the patient, who had no previous dyspeptic history, recovered without any further untoward effects and investigation showed no gastric or duodenal abnormality. The other patient, a man of 69, received several injections of hydrocortisone into the shoulder-joint for a tear of the rotator cuff. He had a known dyspeptic history

and was hypertensive. Three days after his last injection he was found unconscious at home; he was admitted to hospital and 24 hours later died. At necropsy death was found to have been due to a cerebral thrombosis. Examination of the stomach showed several superficial ulcerations with eosinophilic infiltration of the bases; the bowel was full of recent and altered blood.

One case of melaena followed 30 hours after injection of hydrocortisone. Unfortunately this patient was treated at another hospital, and it was impossible to obtain a detailed report of the investigations other than the fact that no abnormality was found. There has been no recurrence.

NAUSEA AND VERTIGO

These symptoms have been observed in eighteen cases. In all the cases they started within 45 to 60 minutes of the injection and lasted no longer than 24 hours. Although they were usually severe enough to prevent the patients' continuing with their normal activities, there was no vomiting and no abnormality was found on examination.

LOCAL EFFECTS

URTICARIA

Urticaria and oedema around the site of the injection occurred in eleven patients. This symptom was only transient, producing no disability and very little discomfort. Recovery occurred in all cases within 24 hours without treatment.

LOCAL WEAKNESS

Local weakness was observed in twenty-four patients, being particularly noticeable in those treated for "tennis elbow". The greater number of cases occurred among patients given hydrocortisone alone, but in four of the twenty-four cases 2% procaine hydrochloride either had been injected before the hydrocortisone or was included with it.

On examination a definite objective weakness of the muscles surrounding the site of injection was always found. There was no sensory loss, and electromyographic tracings showed no abnormality. All patients recovered without treatment within 24 hours of the onset of symptoms.

LOCAL SEPSIS

Four patients required treatment for local septic conditions resulting directly from the injection.

1. A physiotherapy student aged 19 developed a local subcutaneous abscess at the site of an injection for tennis elbow. She did not respond to antibiotics and incision was necessary.

2. A doctor's wife developed a mild septic arthritis following injection of hydrocortisone for an intermittent hydrarthrosis of rheumatoid origin. She responded satisfactorily to chlortetracycline by mouth and was eventually able to continue with her articular injections.

3. A relative of one of the medical staff of the physical medicine department developed a septic arthritis of the distal interphalangeal joint of the right forefinger following an injection for osteoarthritis. This resulted in a low-grade osteomyelitis of the terminal phalanx, which responded eventually to parenteral administration of penicillin and tetracycline by mouth. She developed some shortening and deformity of the terminal phalanx and lost the function of the distal interphalangeal joint.

4. One patient developed a superficial abscess at the site of injection in a "multifidus" syndrome. This did not respond to oral or parenteral administration of antibiotics and eventually required incision.

LOCAL EXACERBATION OF SYMPTOMS

In nearly 20% of the cases an acute "flare-up" of local symptoms for which the patient was being treated followed the local injection of hydrocortisone. This was particularly noticeable in the treatment both of soft-tissue lesions and of rheumatoid arthritis. Discomfort was occasionally acute, but seldom lasted more than 24 hours. Such exacerbation has been repeatedly observed, and it was uniformly noted (although for obvious technical reasons impossible to control) that following an exacerbation the subjective and objective response to treatment was highly satisfactory; also the greater the local reaction the more effective and long-lasting the clinical response.

DISCUSSION

It has been shown that the incidence of detectable side-effects in the above series, on the basis of the number of hydrocortisone injections given, was 1·09%; this is apart from the short period of exacerbation of symptoms already mentioned, which followed with such frequency that all patients are now warned of its likelihood and it is not regarded as other than a natural consequence of the treatment.

Combined injections, with the inclusion of either hyaluronidase (1,000 Benger units) or 2% procaine hydrochloride, preceded twelve of the reactions, and it is possible that these agents rather than the hydrocortisone were responsible for the ensuing ill effects.

In three of the patients who suffered from urticaria, in one with purpura, and in the one who had bronchospasm after the injection, hyaluronidase was

included with the hydrocortisone as a "spreading" agent. It is felt unlikely, however, that a substance such as hyaluronidase, which is present to so widespread and intimate an extent in the interstitial tissues, could be responsible for such reactions. Seifter (1950), moreover, observed a complete absence of side-effects following the administration of more than 200,000 times the therapeutic dose of hyaluronidase in animals; and in a series of more than 200 patients injected with hyaluronidase and saline alone Kendall (1954) also recorded a complete absence of undesirable reactions. This would suggest that hyaluronidase is a particularly non-toxic substance; indeed, the majority of untoward reactions observed in the present series occurred where the hydrocortisone had been injected alone and hyaluronidase could not be implicated.

Following injections of hydrocortisone combined with procaine hydrochloride two patients developed urticaria and one bronchospasm, and four experienced a peculiar local muscular weakness. Again it is possible that it was the procaine that was responsible for these reactions, particularly as this substance has already been observed to lead to a variety of undesirable consequences.

It was unfortunately not possible to come to a more definite conclusion in individual cases as to which was the responsible antigenic agent, for although the patients were skin-tested when side-effects had followed the injection, no satisfactory results were obtained; neither was it considered desirable in the patient's interest to perform tests with large doses of the suspected toxic substance.

With the exception of local sepsis, the nature of the mechanism of the side-effects of hydrocortisone injection is, at first, apparently difficult to explain. The urticaria, asthma, and haemorrhagic symptoms, the nausea and vertigo can all be explained on a basis of allergy. Hydrocortisone, however, exerts a strong anti-allergic effect, and it is indeed frequently used to combat allergic reactions. It is more likely that some other agent introduced at the time of injection was responsible. The majority of manufacturers add a preservative and an inhibitory antiseptic to the suspension, and although no investigation has so far been made of the toxic effects of these substances, it is possible that the latter are responsible for at least a proportion of the reactions.

The occurrence of only four cases of sepsis following 6,700 intra- and peri-articular injections is regarded as indicating that the procedure can be satisfactorily performed in practice without undue risk of this hazard. Although autoclaved instruments were used throughout, "office" procedure was adopted at all times—that is, adequate skin toilet and cleansing was ensured, but sterile towels, gloves, and masks were not used. Such an incidence is lower than would usually be expected following any other form of skin puncture, and this may

well be due to the presence in the hydrocortisone of small quantities of the bacteriostatic agents mentioned above.

The incidence of untoward side-effects in this series has been considerably higher than that observed by Hollander, and several of the reactions were more serious, there being one death possibly attributable, even if only in part, to the hydrocortisone. This should be regarded as a warning that the method does have its risks and should be practised not only with adequate preparation, but in the knowledge that similar or even more severe complications may occur. While it is suggested that the side-effects in our series were of sufficiently low level not to constitute a contraindication to its use unless previous allergic effects have been observed in individual patients, there seems to be reason, however, for constant awareness of their possible occurrence.

SUMMARY

Seventy-three cases of untoward reactions following intra- and peri-articular injections of hydrocortisone are reported. These side-effects included purpura, haematemesis, urticaria, nausea and vertigo, local muscular weakness, bronchospasm, and local sepsis. The mechanism of some of these reactions is discussed.

It is considered that the over-all incidence and morbidity of the side-effects following the local use of hydrocortisone are so low as not to constitute a contraindication to this method of treatment.

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REVISION SERIES

STEROID THERAPY

(*concluded*)

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THIS review has so far been confined to a consideration of the systemic administration of steroid drugs, most of the clinical applications of which have been concerned with rheumatoid arthritis, and it is almost exclusively for this disease that these drugs are prescribed systemically and for long periods in physical medicine departments. Furthermore, most of the principles enunciated for the treatment of rheumatoid arthritis are equally applicable to other diseases for which steroid therapy is indicated.

When considering *local* therapy with these drugs (excluding their use in dermatology and ophthalmology) the majority of applications are relevant to the practice of physical medicine, so much so that they have been responsible for some very striking changes in the administrative and physiotherapeutic requirements of physical medicine departments.

PREPARATIONS AVAILABLE FOR LOCAL INJECTION

HYDROCORTISONE AND CORTISONE ACETATES

Until about a year ago the only steroid preparations which were available for local injection were cortisone acetate and hydrocortisone acetate. Opinion now appears unanimous that the latter is by far the more effective agent for local therapy, and Fearnley (1953) represented a very small minority opinion when he claimed that the difference between them was quantitative rather than qualitative and that 100 mg. of cortisone acetate produced approximately the same result as 50 mg. of hydrocortisone acetate. He postulated that cortisone was converted to hydrocortisone by the synovial tissue, a view directly opposed to the findings of Ziff *et al.* (1952). However, this same group of workers (Wilson *et al.*, 1953, 1954) later confirmed that the conversion can be performed by the synovial membrane under certain conditions, but it certainly does not occur uniformly and sometimes both drugs are metabolized by completely different processes.

More recently Egelius *et al.* (1956) have provided apparently conclusive evidence that these two steroids do not act within the joint cavity in the same

way. As measured by the "anomalous viscosity", hydrocortisone consistently caused a repolymerization of synovial hyaluronic acid within two to four days, while cortisone produced virtually no change in this characteristic.

It has been suggested that the superiority of hydrocortisone over cortisone in local therapy might be due to its relatively greater insolubility, but Coste *et al.* (1955) disproved this hypothesis by showing that hydrocortisone hemisuccinate, which is appreciably more soluble than hydrocortisone acetate, is also considerably more potent as a local anti-inflammatory agent. (Presumably this substance has not been developed commercially because it caused pain after injection.) These authors subscribe to the view that hydrocortisone works better than cortisone merely because, without any preliminary metabolism, it can exert an immediate action on inflamed tissues.

Esters of Hydrocortisone

Hollander *et al.* (1954) give a detailed account of their trials with higher esters and analogues of hydrocortisone. The stimulus for these clinical trials was provided by earlier laboratory experiments which indicated that injected hydrocortisone was very rapidly absorbed by the cells in the synovial fluid and especially by the lining membrane of the synovium. This absorbed fraction remained for a considerable time in its esterified form without being metabolized, whereas the fraction remaining within the synovial fluid was very rapidly hydrolysed and broken down (Hollander, 1953a; Zacco *et al.*, 1954). The compounds which they tested included three analogues of hydrocortisone—namely, 9-alpha-fluorohydrocortisone, 9-alpha-chlorohydrocortisone, and allo-dihydrohydrocortisone—and three higher esters: hydrocortisone tertiary butyl acetate (F t.b.a.), hydrocortisone caprylate, and hydrocortisone benzoate. Of these preparations only F t.b.a. gave results consistently superior to those obtained with hydrocortisone acetate. The hydrocortisone caprylate and benzoate esters proved impractical because of the severe synovial irritation which they caused. F t.b.a. was said to produce greater and more prolonged palliation than hydrocortisone acetate in about 60% of patients. In about 35% of cases no advantage was noted, and in about 5% the hydrocortisone acetate was more effective. The 9-alpha-fluoro and chloro and the allo-dihydro derivatives proved to be extremely strong anti-inflammatory agents, but their sodium-retaining propensity was so great that a dosage of 7·5 mg. into one knee or 5 mg. into each knee caused marked oedema of the legs which persisted for several days. This unpleasant side-effect nullified any advantage which might otherwise have accrued from the increased potency.

At the 1954 meeting of the American Rheumatism Association (A.R.A.,

1954) general agreement with these findings was reported. For example, Duff reported in approximately 50% of rheumatoid arthritics a clinical response lasting four to ten days with hydrocortisone acetate and eleven to twenty days with F t.b.a. Freyberg's findings were less encouraging, since only 39% of his patients responded for a significantly longer period with the new compound, and the proportion was no higher when measured in terms of degree of relief. In no case was the increased duration of response more than double that obtained with hydrocortisone acetate. A few patients who had previously shown no response to hydrocortisone acetate benefited from the use of the new preparation. In direct contrast to the qualified optimism of these findings was the report of Zuckner *et al.* (1956), who found no significant difference in the degree or duration of antirheumatic response between hydrocortisone acetate and F t.b.a. They also asserted that 25 mg. of each preparation was the optimum dosage, even for large joints, and that increasing the dosage up to 100 mg. did not improve the response.

Although supplies of F t.b.a. have been available in this country now for over a year, little has yet been published about this drug. Any decision as to its enhanced usefulness would be an important one if only because it costs approximately 50% more than hydrocortisone acetate. In the limited experience of one of us (J. H. G.) F t.b.a. seems to provide little advantage in the majority of cases, though occasionally an unpredictable and considerably enhanced response is obtained.

It was only to be expected that the delta derivatives of cortisone and hydrocortisone would be prepared in a form suitable for local injection, and a few foreign reports are available concerning clinical trial with such preparations as prednisone, prednisolone, and prednisolone tertiary butyl acetate. Robecchi, Cartesegna, and Daneo (1955) report that the clinical effect of 5 mg. prednisone acetate is rather less than that of 25 mg. hydrocortisone acetate: with 10–25 mg. doses, however, prednisone is more effective. No ill effects from its use were noted. The same workers (Robecchi, Daneo, and Cartesegna, 1956) report similar findings with prednisolone acetate.

Thompson (1957) reports no significant difference between the effect of prednisolone acetate or prednisolone trimethyl acetate compared with hydrocortisone acetate in the treatment of large or medium-sized rheumatoid joints. He found, however, that in the small joints of the hands the effect of prednisolone acetate was significantly better than that obtained with hydrocortisone acetate in terms of both degree and duration of response. Limited experience in the use of prednisolone trimethyl acetate has not, in the experience of one of us (Newton, 1957), shown it to possess any advantage over hydrocortisone acetate in the treatment of soft-tissue lesions.

CLINICAL TRIALS OF LOCAL HYDROCORTISONE IN RHEUMATOID ARTHRITIS

Despite the voluminous literature on the local use of intra-articular hydrocortisone* there are only a few reports of adequately controlled trials. One of the earliest of these was by Dixon and Bywaters (1953), who compared the clinical and laboratory effects of cortisone and hydrocortisone against those of suspending agents alone in patients suffering from rheumatoid arthritis. Their conclusions left no doubt as to the beneficial effects of the steroids judged both clinically and by their effects on the joint fluid. Fearnley *et al.* (1956) used a "cross-over" technique in their therapeutic trial. Hydrocortisone was compared with procaine and, to quote their conclusions, "hydrocortisone appeared to show a slight advantage over procaine which was not statistically significant". However, these conclusions must be interpreted with caution, because the trial was designed primarily to validate methods of clinical assessment rather than to evaluate the use of one particular drug, and only ten patients were included.

Two groups of research workers in the United States have made an intensive study of this subject during the past five years, and since their results and most of their views have received general acceptance their publications deserve particular emphasis.

Duff and his group from Ann Arbor (Duff *et al.*, 1955) present a well-documented report of their results in 60 patients with rheumatoid arthritis, in whom a total of 105 joints were injected on 1,020 occasions. In 35 of these patients laboratory studies were made of the effect of the injections upon the synovial fluid. Of the joints treated, 86 were knees, the remainder being elbows (7), ankles (7), wrists (3), and hips (2). Judged after three separate injections, there was a complete failure of response in 19% of the joints, but there were no clues as to how these failures might have been anticipated. Treatment was discontinued in 31% of the joints, either because the initial improvement could not be maintained or because of failure to achieve progressive improvement. In 50% of the joints worthwhile and sustained benefit was achieved by serial injections. In 10 further joints injections were successfully given to facilitate treatment by an orthopaedic or physical manœuvre, and, in common with most others, these authors regard this as an important indication for local hydrocortisone therapy. In 12 joints in 7 patients it was possible to discontinue treatment because of an apparent remission of the disease process. In this connexion Duff (1956) reports an interesting experience with a patient who apparently

* For the sake of simplicity the term "hydrocortisone" will, for the remainder of this article, be taken to imply hydrocortisone acetate unless otherwise specified.

sustained a complete remission following local hydrocortisone therapy: during the course of an operation following a motoring accident it was possible to obtain a biopsy specimen from one of the knees, and this showed unmistakable evidence of persistent rheumatoid inflammation. Duff and his colleagues point out that apparent control of the rheumatoid process may occur in treated joints together with progressive arthritis in other joints. Whilst this may be coincidental in many cases, they specify the exacerbation of hip-joint disease which is caused by the increased bodily activity that frequently occurs following injection of the knees. A patient who does not respond to a course of injections spaced at one or two weekly intervals may sometimes respond to the cumulative effect of injections made at intervals of three to four days for a period of one to two weeks. Improvement in synovial-fluid characteristics (the relative viscosity, the polymorphonuclear leucocyte count, and the concentration of the polysaccharide component) was often related to clinical improvement, but significant dissociation occurred in 10 of the 35 cases.

Hollander (1953b) and his colleagues in Philadelphia summarize their findings following 8,693 injections in 852 patients thus: "It cannot be overemphasized that this form of therapy is for local palliation and is not a substitute for any generalized rheumatic treatment . . . this local method has also proved valuable as an adjunct to orthopedic surgery and in rehabilitation . . . it is also valuable in the management of osteoarthritis and gout." This group of workers has also carried out some interesting studies on the effect of local hydrocortisone on the intra-articular temperature in rheumatoid arthritis (Hollander *et al.*, 1951) and have contrasted this with the effect in osteoarthritis (Hollander and Moore, 1956). A rather surprising discrepancy was noted in the behaviour of these two diseases in this respect. In rheumatoid arthritis hydrocortisone caused a consistent and significant lowering of the intra-articular temperature, whereas in osteoarthritis and in cases of traumatic arthritis, although the initial temperatures were consistently higher than normal, hydrocortisone seemed to cause a further rise in temperature in some cases but not in others: these anomalous results could not be correlated with the clinical response.

CLINICAL RESPONSE OF OSTEOARTHRITIS TO INTRA-ARTICULAR HYDROCORTISONE

Opinions on this subject are not as clear-cut as they are in the case of rheumatoid arthritis, and vary between those who regard this treatment as valueless and those who assert that some of their longest and most satisfactory responses to treatment occur in osteoarthritic joints. This discord is, to some

extent, due to the fact that the term "osteoarthritis" covers such a wide range of pathological effects, ranging from acute exacerbation with inflamed synovial membrane and effusion to the chronically disorganized but non-inflamed joint which occurs so commonly in old age. There is no reason why an anti-inflammatory agent should by itself have more than a very temporary effect in the latter group, whereas it may actually be curative in the former situation if the circumstances which provoked the exacerbation have been removed by the time the effect of the hydrocortisone is wearing off. These theoretical explanations agree closely with our own practical experiences, although Hollander's curious joint-temperature results suggest that there are other factors which are not yet understood.

Among those who have found this form of treatment to be relatively ineffective in osteoarthritis are Bornstein *et al.* (1954), who state that hydrocortisone was effective in 83% of their cases of rheumatoid arthritis, but that in osteoarthritis they obtained improvement in only 48% of cases, and any improvement noted was subjective rather than objective. They particularly stress the value of intra-articular therapy in geriatric practice, where the effects of systemic steroid drugs may often have serious repercussions.

Kendall (1956) found that in 36 cases of bilateral static osteoarthritis of the knees improvement following the injection of hydrocortisone was no greater than in the control cases which were given injections of 2% procaine. By contrast, Leveaux and Quin (1956), in a controlled trial of "hydrocortisone versus procaine" in osteoarthritis of the hip, conclude that "our observations in this series and our experience in other cases lead us to believe that procaine alone is far inferior to the combined hydrocortisone and procaine injection, which is of definite value as a palliative measure in the treatment of osteoarthritis of the hip".

Of Hollander's cases of osteoarthritis (Hollander, 1953b) 20% had no return of symptoms following a series of injections, and some of these had been followed for more than a year. Ramsey and Key (1953) also report satisfactory relief of symptoms in osteoarthritis lasting far longer than was the case in rheumatoid arthritis.

Thus the indications for the use of hydrocortisone in osteoarthritis remain controversial. Though occasionally brilliant, results cannot be expected to be consistent, and the response probably depends largely on the state of the joint tissue at the time of injection.

INJECTION OF THE SPINAL COLUMN

Recently reports have been published of attempts to use hydrocortisone for the treatment of disorders of the vertebral column, but it is as yet too early

to form a judgment on the value of these methods, though their potential value demands critical attention.

Feffer (1955) argues that protrusions of the intervertebral disk result from changes in the osmotic fluid balance within the nucleus pulposus, which process might be reversed by hydrocortisone. Accordingly 60 patients with suspected disk disease were investigated by combining a nucleogram with an injection of the steroid in order that the results might be interpreted in the light of the pathology illustrated. Of the 60 patients, 55 had pathological disks, and 67% of these obtained rapid relief which was maintained for at least eight months in all but four cases. Of the 18 patients who were not relieved 16 were later proved by surgical exploration to have gross ruptures through the annulus fibrosus.

Cohen *et al.* (1955) have studied the effect of spinal intra-articular and paravertebral injections of steroids in patients suffering from vertebral degenerative disorders. Their technique is based on the assumption that the pathological process extends more widely than is suggested by the radiographic appearances. A series of 46 patients were injected with up to 23 doses each of 12·5–25 mg. cortisone or hydrocortisone, usually at intervals of one to two weeks, and no difference was noted in the responses to these different compounds. Of 26 patients with cervical osteoarthritis, 14 claimed relief of their symptoms, as did 11 of 14 patients whose sacro-iliac joints were injected, and a subsequent trial of prednisolone gave similar results. This paper, however, must be severely criticized, not only because of the lack of control cases, but also because the results appear to have been assessed entirely on the basis of the patient's subjective impressions.

Lièvre *et al.* (1955) and Barvaso (1956) claim success for the treatment of "lumbago" and "neuralgia" with subarachnoid hydrocortisone, but Cyriax (1957a) has found epidural hydrocortisone injection to be valueless.

DOSAGE

Hollander (1954a) states categorically that the optimum dose for the intra-articular injection of hydrocortisone is between 25 and 37·5 mg. He quotes some experimental connective-tissue work in support of his thesis that if more than the optimum dose is injected, not only may no greater benefit result, but there may even be a diminished response. Duff in the ensuing discussion states that serial injections of 10 mg. hydrocortisone are capable of achieving definite improvements in synovial-fluid characteristics without obvious clinical benefit. Repeated injections of 25 mg. are associated with both clinical and joint-fluid improvements, but there was no evidence that dosages in excess of 50 mg. offered any particular advantage. These figures appear to have been universally

accepted, and are reproduced, perhaps a little uncritically, in most textbooks and pharmaceutical manuals. One of us (J. H. G.) is currently collecting data which bear upon our conviction that these doses are well below the optimum in a large proportion of patients. Personal experience suggests that by increasing the dosage to 50 mg. in the middle-sized joints (e.g. wrists, elbows, and ankles) and 100 mg. in the larger joints (e.g. knees and hips) significantly more joints can be benefited to a greater extent and for a longer period. Preliminary results appear to substantiate this opinion, but a detailed analysis is not yet available. Robecchi, Cartesegna, and Daneo (1956) discuss the value of even higher intra-articular doses of hydrocortisone acetate, and it seems that this problem still requires an open-minded approach.

SIDE-EFFECTS

It is generally agreed that the undesirable side-effects which may result from intra-articular injections of hydrocortisone are comfortingly few, and that their incidence is not greatly increased if the injected hormone goes into the peri-articular tissues rather than into the joint itself. Hollander (1953b) reported an over-all incidence of side-effects of 2·3% in his very large series, and most of these (1·9%) consisted of temporary exacerbations lasting from 2 to 72 hours at the most: 0·2% were complaints of local weakness, 0·17% were complaints of general weakness, and 0·4% consisted of local urticaria. Spread of the rheumatoid arthritis was seen in 0·02%, joint infection in 0·02%, thrombophlebitis in 0·02%, and an exacerbation of tuberculous arthritis in 0·01%.

Bagnall (1956) states that an immediate reaction to the injection of hydrocortisone or prednisolone might be expected in about one in every hundred injections. There was no obvious explanation for this phenomenon and it might occur quite erratically—for example, after the first injection but not after subsequent ones, whereas in other cases the reaction might become progressively worse after each injection, thus conforming to the pattern of the Arthus phenomenon. He had observed two patients with a delayed response resembling serum sickness occurring five and ten days respectively after a severe immediate reaction. In neither case was there a past history of allergy, and curiously enough both responded very well to a course of systemic steroid therapy.

Kendall (1956) records three cases of transient local urticaria, two cases of local inflammation, and one of mild suppurative arthritis of the knee-joint. Bremner (1954) reports a case in which a fatal miliary spread of tuberculosis occurred as the result of intra-articular hydrocortisone injection mistakenly made in a patient suffering from tuberculous arthritis, and Kaplan (1954) reports having seen in the course of a few months no fewer than six cases of

septic arthritis which were attributable to intra-articular hydrocortisone injection, and as a result he is naturally at pains to advocate a rigid standard of aseptic technique for this procedure.

METHODS

1. Asepsis

We have already drawn attention to the low incidence of infective complications in most published series. This is in striking contrast to the prognostications of those pessimists who claimed that it was essential for intra-articular injections to be performed with a rigid non-touch technique in an aseptic atmosphere. Strict adherence to this principle would have precluded the development of a very useful form of therapy as a routine out-patient technique.

The correspondence between Kaplan (1954) and Hollander (1954b) thoroughly aired these discrepant opinions. Kaplan states that: "It is important to recognize that the joints into which these injections are given are not normal joints and that their resistance to infection is considerably lowered by the disease process and the attendant circulatory impairment." He rejects Hollander's contention (1953b) that intra-articular injections are comparable in their simplicity to venepuncture. As a rejoinder Hollander quotes his series of 17,000 injections with "only simple but careful instrument technique and aseptic precautions". In only four instances did septic arthritis occur (an incidence of less than 1 in 4,000) and these were easily controlled by prompt and adequate antibiotic therapy. The skin, syringes, and needles require careful sterilization, but drapes and gloves are not necessary and only make the procedure more complicated.

Our own experience leads us strongly to support Hollander's more practical approach to the problem.

2. Joint Anatomy

The consistency with which local injections of hydrocortisone are successful depends largely on the accuracy with which they are placed. The ease with which a particular joint may be injected depends on such factors as the degree of swelling, the nature of pre-existing mechanical derangement and deformity, the presence of osteophytes, etc., but above all it depends on a sound appreciation of the anatomy of the joint and its environs. Most clinical textbooks deal briefly with this subject, and the illustrations provided are frequently confusing. Detailed descriptions of the technique involved in the injection of the different joints are given by the American Association of Anatomists (1956), by Miller (1956, 1957), and by Glyn (1957), and these will repay careful study by anyone intending to acquire a good technique for intra-articular injection and aspiration.

3. "Hypospray" Injection

This technique was originally designed to introduce substances under pressure either subcutaneously or intramuscularly without using a needle. Ziff *et al.* (1956) describe an adaptation and extension of its usefulness for the purpose of giving intra-articular injections with considerable simplicity and without pricking the patient. They had a special instrument made which was approximately 18% more powerful than the standard one hitherto available. By dye studies and by recovery experiments they proved conclusively that a measurable proportion of the fluid did in fact enter the joints, the remainder being found in and around the periarticular tissues in close proximity to the joint, and they assert that this fraction also probably exerts a beneficial effect. They state that their clinical results compare favourably with those claimed by other workers using more orthodox techniques, and maintain that their technique is simple. Many joints can be injected at one sitting, and most patients appear to prefer this method to multiple needle injections. Clearly the technique is more suitable for injection of the smaller than the larger joints, but one natural disadvantage is the impossibility of withdrawing fluid for diagnostic purposes. A few patients with non-articular rheumatism were also injected by this method with good results.

4. Multiple Intra-articular Injections

It is usually taught that intra-articular therapy is practicable only in patients who either have very few joints involved or in whom one or two joints are especially inflamed and are holding up progress: in the majority of instances this generalization is undoubtedly true. There are, however, a certain number of patients with multiple joint involvement which does not respond to simple treatments but who are not, for some reason, suitable for systemic steroid therapy. A few of these patients have been subjected, under a general anaesthetic, to multiple simultaneous injections with excellent results. Although up to twenty-six injections have been given at one session, no systemic effects have been noted to result from the moderately large total dosage which has thus been injected, and frequently a surprising number of joints maintain their improvement for long periods, so that reinjection of only selected ones is required at subsequent sessions.

This technique has also been described by Weismann-Netter *et al.* (1955), who state that they have given several hundred mg. of hormone at one sitting without ill effect. They quote their experience with 7 otherwise resistant patients, of whom 3 showed marked improvement and 3 were moderately improved. In the remaining case, they claim their dosage was too small.

NON-ARTICULAR AND PERIARTICULAR INJECTIONS

Approximately 80% of disabilities of the musculo-skeletal system which result in claims for sickness benefit under the generic diagnosis of "rheumatism" are due to non-articular disorders. It is surprising that the pathology which underlies these various painful, common, and recurring conditions has received far less attention than it should, and consequently the disorders are in many cases poorly understood. However, from a therapeutic point of view this is a field in which empiricism has triumphed over science, for local hydrocortisone has revolutionized treatment in many conditions and is a powerful aid to the more traditional remedies in others, and it is legitimate to use the word "cure" as opposed to "treatment" in a large proportion of cases.

The Shoulder

Pain and stiffness felt in the region of the shoulder girdle are very common presenting symptoms in departments of orthopaedics and physical medicine. Excluding those pains referred from the neck and the relatively small proportion which are due to arthritic changes within the shoulder-joint, the symptoms usually arise from inflammatory or degenerative changes in the "rotator cuff" or in the subacromial bursa. (The "rotator cuff" is a useful clinical concept, and is defined here as the capsule of the joint and all the tendons which are adjacent to it or fused with it, and of these the tendons of the supraspinatus, infraspinatus, coraco-brachialis, and biceps seem to be most frequently involved.)

Coventry (1954) reviews his experiences in the treatment of the painful shoulder both with systemic cortisone when the condition was widespread, and with local hydrocortisone when the lesion could be localized with sufficient accuracy to justify such an injection. He believes that the beneficial action of the latter may arise as a result of its analgesic properties, which thus enable the patient to carry out mobilizing exercises more easily. As a corollary he asserts that in every case carefully planned physiotherapy remained the basis of treatment no matter how successful the superimposed steroid therapy might be. He also found that acute cases responded to steroids better than the long-standing ones, an experience which has been consistently reported by other workers irrespective of their ultimate conclusions concerning the value of the drugs.

Crisp and Kendall (1955b) and Kendall (1956) report excellent results following the local injection of hydrocortisone in 61 "acute" lesions of the rotator cuff. Of these, 45 obtained complete relief of symptoms within seven to fourteen days. The "chronic" cases did not fare so well, nevertheless 13 out of 23 cases progressed to complete recovery over a period of four to six weeks.

Their technique was a little unusual in that they mixed their hydrocortisone with 100 units of hyaluronidase and 1-3 ml. of 2% procaine and they also injected the shoulder at three sites—namely, into the joint cavity from a posterior approach, anteriorly into the subacromial bursa, and antero-laterally into the long head of biceps.

Hollander (1953b) states that local hydrocortisone injections were successful in relieving 80% of cases of acute subacromial bursitis, but in only 49% of chronic cases. Ramsey and Key (1953) consider the response of patients with acute calcific bursitis to be better with this method of treatment than with any other, and Quin (1955) achieved the same excellent results in 4 cases of acute bursitis. In 14 more chronic cases he reported marked relief of symptoms in 7 and no benefit in 7, the results being roughly proportional to the duration of symptoms and the mobility of the glenohumeral joint at the beginning of treatment. Cyriax and Troisier (1953) stress the importance of making an accurate diagnosis with exact location of the lesion so that hydrocortisone may be accurately injected. They base their diagnosis on a comprehensive examination of the active, passive, and resisted movements of the joint, and they conclude that, whereas hydrocortisone has a large part to play in the treatment of "infective" arthritis, it has no effect whatsoever on so-called "freezing" arthritis. Murnaghan and McIntosh (1955) carried out a controlled trial of this form of therapy, injecting with hydrocortisone 24 patients complaining of painful shoulders and comparing the results obtained in 27 similar patients injected with 2% lignocaine. In both series 1,000 units of hyaluronidase was added to the test substance and the injections were made as widespread as possible into the capsule and pericapsular tissue of the shoulder-joint. Both types of injection were found to produce measurable benefit, but hydrocortisone was not shown to be superior to the local analgesic except, surprisingly, in the more long-standing cases. One of us (Newton, 1955) was among those who challenged the validity of these results on the grounds of lack of precision in diagnosis, since it appeared that the term "painful shoulder" could include a number of conditions bearing widely differing natural histories.

Blockey *et al.* (1954) carried out a controlled trial of oral cortisone in the treatment of 32 cases of periarthritis of the shoulder, and found that, while cortisone appeared to expedite the relief of pain and reduce the number of patients requiring manipulation, none of the separate differences between the control and cortisone groups reached statistically significant levels.

Our own experiences confirm the view that injections of hydrocortisone are of little or no value in cases of established periarthritis of the shoulder ("frozen shoulder"), but are of very considerable value in local lesions of the "rotator cuff" and subacromial bursa.

Shoulder–Hand Syndrome

Since some cases of periarthritis of the shoulder are believed to arise from reflex sympathetic dystrophy, this would be a convenient place to review the effects of steroids on the more advanced stage of the reflex dystrophy which is colloquially known as the "shoulder-hand syndrome". Most of the reports have been concerned with systemic rather than local administration of the drugs. For example, Russeck *et al.* (1953) obtained moderate to complete relief with cortisone in 16 out of 17 patients suffering from this condition following myocardial infarction; but Steinbrocker *et al.* (1953) conclude from their experiences that sympathectomy still remains the treatment of choice, with cortisone or corticotrophin taking second place. Sudeck's atrophy following trauma is the other common condition in this group of disorders in which favourable results from the use of cortisone have been reported by Dwyer (1952) and unfavourable results by Rose (1953).

Lateral and Medial Epicondylalgia ("Tennis" and "Golfer's" Elbow)

There is almost uniform agreement that in these troublesome conditions an accurately placed injection of hydrocortisone (with or without procaine) is an extremely effective method of treatment. Claims of up to 100% success have been made (Teixeira and Barata, 1954), but most workers stake their claims for a cure at about 70-80%, and furthermore observe that about 10% of these "cures" relapse within a period of three months and may need further injections. Cyriax (1957b) feels that if cure is not obtained after two accurately placed injections there is no purpose in continuing with this form of treatment.

Murley (1954) and Quin and Binks (1954) report excellent results which leave them in no doubt that local hydrocortisone injections are preferable to any of the previously available methods of treatment both as regards the incidence and the duration of relief of symptoms. By contrast, Freeland and Gribble (1954) conclude from 16 "blind" injections into 14 patients (followed up for two to four months) that the benefits obtained from both procaine and hydrocortisone were indistinguishable and due to the non-specific effect of the injection or even the trauma of needling rather than to the hydrocortisone.

Our own experiences with hydrocortisone injection for the treatment of tennis and golfer's elbow have been extremely satisfactory and leave no room for doubt that this is an important advance in the treatment of this condition, the benign nature of which is only matched by its frequent intractability and the significant disability which it not uncommonly produces.

Miscellaneous Soft-tissue Lesions

Cyriax and Troisier (1953) report a successful result following the local injection with hydrocortisone of a patient with tenosynovitis involving the flexor carpi radialis tendon. Kendall (1956) reports relief in a "high percentage of cases" of tenosynovitis.

Crisp and Kendall (1955a) cured 4 patients complaining of trigger finger by injecting 12·5 mg. hydrocortisone into the tendon sheath, and they also report excellent immediate results from local injection of 6 early cases of Dupuytren's contracture. In prepatellar and olecranon bursitis they obtained dramatic results in 10 out of 14 cases, but record disappointing relapses in eight of these within a period of up to two months; although response was obtained to further injections, recurrence sooner or later was invariable. Of 20 cases of localized muscular and tendinous lesions also treated, 14 were completely cured and 3 were unrelieved. Twenty-one of 29 cases of traumatic effusion responded very rapidly to hydrocortisone, 7 were improved, and only one remained static. These authors give an excellent review of the many and varied uses of hydrocortisone in lesions usually treated by prolonged physiotherapy: their over-all results in 209 such cases showed a cure rate of 80%, a failure rate of 10%, and a recurrence rate of 10%.

Bornstein *et al.* (1954) reported especially good results in 7 cases of tenosynovitis of the fingers, 5 showing complete resolution and the other 2 "major improvement".

Christie (1955) treated 20 patients suffering from de Quervain's disease with local hydrocortisone injections and 10 control cases with 2% procaine alone. A significant advantage was noted for the hydrocortisone treated cases, 14 of them remaining free of symptoms for periods exceeding three months following a single injection. No complications occurred, and any case which relapsed was found to respond rapidly to a second injection given at the same site. All the control cases relapsed completely within a period averaging two days.

Becker (1953) surveys the treatment of 131 ganglionic swellings. Thirty of these were treated with hydrocortisone suspended in saline, and the others by various orthodox measures. Cases treated either conservatively or surgically required an average of sixty-six days of partial or total disability, whereas those treated with hydrocortisone required an average of ten days to achieve a cure and suffered no significant disability.

Blockey (1956) carried out a controlled trial of local injections of hydrocortisone in 22 "painful heels" of undetermined origin in 19 patients, using saline as the control injection. The response in both groups was good, but no statistically significant difference could be detected between them.

Yet another field in which local hydrocortisone injections provide an excellent and rapid method of treatment is that of athletic injuries with localized ligamentous and soft-tissue strains. Surprisingly little appears to have been published on this subject, although experience suggests that this type of lesion provides one of the commonest and most rewarding applications for the use of this drug.

In some of the more ill-defined soft-tissue lesions accurate placing of the injection can be very difficult, and we have found that it is frequently an advantage, from the point of view of both technique and economy, to dilute the hydrocortisone suspension with a suitable quantity of 1% procaine.

THE STEROIDS AS AN ADJUNCT TO MANIPULATION

The capacity of the steroids to suppress inflammation made it logical to investigate their clinical effects as adjuncts to manipulative procedures, it being hoped that they might suppress the reactionary pain and spasm which so frequently negative the benefit obtained from manipulation itself.

Reference has already been made to the controlled trial carried out by Blockey *et al.* (1954), who found that the administration of cortisone did tend to reduce the number of patients suffering from periarthritis of the shoulder who eventually needed manipulation, but it did not seem to yield much benefit, however, as a "cover" for the manipulation itself. This experience conflicts with that recorded by Steinbrocker *et al.* (1953), who found that in 7 cases after the manipulation of frozen shoulders corticotrophin (given either by intravenous infusion or as a long-acting gel) was extremely effective in enabling the patient to regain his full range of movements by exercises.

The Medical Research Council and Nuffield Foundation (1954) report the results of a controlled trial of cortisone versus tab. eodeine co. as an adjunct to the manipulation of knee-joints in which flexion contractures had been caused by rheumatoid arthritis. Four different centres participated in the trial in which 18 patients were allocated to the cortisone group and 15 were given tab. codeine co. alone, the groups being, so far as possible, accurately matched as regards age, sex, and the length of time the knee had been contracted. The results revealed no advantage of cortisone (in large doses) over tab. codeine co. as a "cover" for manipulation of the knee, though there was inevitably some criticism of the techniques involved in the trial.

Arden (1956) reports a similarly disappointing comparative trial of cortisone versus codeine co. mixture as an adjuvant to Judet arthroplasty of the hip. Twenty operations on 18 patients were investigated, the patients being allocated at random to one or other group. After six months and one year

there was no difference between the two groups as regards range of movement, degree of pain, or functional capacity.

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BRITISH ASSOCIATION OF PHYSICAL MEDICINE

PROVINCIAL MEETING

THE 1957 Provincial Meeting of the Association was held at the Royal Hampshire County Hospital, Winchester, on Saturday, September 28, with the President, Dr. P. Bauwens, in the Chair.

MAXIMUM FUNCTION AND THE HANDICAPPED PATIENT

After welcoming the large number of members present, Dr. W. Russell Grant, Director of Physical Medicine at Winchester, introduced the subject of "Maximum Function and the Handicapped Patient". He suggested that in every case of disablement an attempt should be made to achieve personal, domestic, and financial independence, and by the use of illustrative cases he demonstrated what could be obtained with the aid of "a little ingenuity and common sense".

The remainder of the morning session was devoted to a comprehensive tour of the physical medicine department, particular attention being paid to the "daily living" department and to the hydrotherapy pool which had been built at an almost unbelievably low cost. Some of the methods used to help handicapped patients incorporated interesting refinements. Members gained the impression that behind this department lay a highly fertile mind, and it was useful to know where they could turn for advice in case of need.

INTEGRATION OF PHYSICAL MEDICINE IN A RURAL AREA

The afternoon session was opened by a forthright and stimulating address by Dr. J. Revans, Deputy Senior Administrative Medical Officer of the South West Metropolitan Regional Hospital Board, who showed how the specialty of physical medicine had been developed and gradually integrated with other specialties in that region. Throughout the country a great many difficulties were attributable to the shortage of money available to Regional Boards, and it was startling to learn that recently when a helicopter and a modern fighter aircraft crashed the loss incurred was equivalent to eighteen months' income available for Regional Hospital Board capital expenditure. Because of lack of money there continually had to be a revision of plans, and hence the provision in rural areas of small physical treatment centres integrated with the local public transport services, rather than the use of a domiciliary physiotherapy service which proved highly expensive at twenty-five shillings per treatment for a total number of six to eight treatments a day. Although he revealed a refreshing interest in the problems confronting those in charge of physical medicine departments, Dr. Revans did not appear entirely to have grasped the fact that, as well as being the specialty responsible for providing an integrated physiotherapy and rehabilitation service, physical medicine is very much a clinical specialty whose senior members are well able to accept full clinical responsibility alongside their colleagues in other branches of medicine.

PROBLEMS OF AGRICULTURAL RESETTLEMENT

Dr. Russell Grant said that most physical medicine specialists were well aware of the problems connected with industrial rehabilitation and resettlement, but few seemed

to appreciate that those encountered in agriculture were far more difficult to deal with because there were many fewer jobs which could be performed satisfactorily by a disabled man. The usual number of employees in an agricultural unit was four to ten, and on this basis no employer could afford to carry a "passenger", particularly if he lived in valuable tied accommodation which usually was much sought after by fully fit workers.

In practice no person with more than a 10% disability could be resettled in general farming. For example, the idea that driving a tractor was a light job was a complete fallacy: the clutch was very heavy, great dexterity was needed to operate the extra brakes at exactly the right moment, the seat was remarkably uncomfortable, and there was no protection from the weather. In addition, tractor driving could employ one man for a maximum of only 400 hours in the year. Adaptations to make equipment suitable for a particular disability usually created insuperable servicing problems. In a small market garden all the produce grown had to be marketed by the same staff. A herdsman often had to compete with difficult ground as well as with obstreperous animals. All this demanded 100% fitness.

There were, however, some jobs that could provide a disabled person with sheltered, useful employment, particularly on the poultry farm, in greenhouse horticulture, and in the repair of farm machinery.

Aided by a grant from the Nuffield Foundation, an agricultural resettlement department had just been created in close proximity to the physical medicine department at the Royal Hampshire County Hospital. Members displayed great interest in all they saw during a tour of the establishment, which included a large greenhouse, seed-preparation units, and a deep litter. A tractor and other farm implements were available so that a man recovering from illness or injury could ascertain by personal experience whether he could in fact, and not just in theory, perform the duties required of him on his return to work. The unit included a twelve-bedded residential block of excellent design, offering a degree of comfort considerably greater than that found in the home of the average farm worker. Under these conditions a man could be kept for £4 a week, thus releasing a bed in the hospital (costing approximately four times as much) for the use of a patient requiring full medical and nursing care, and at the same time disposing of the necessity for daily transport to and from home.

The proceedings were concluded with a film illustrating some aspects of the rehabilitation of a paraplegic schoolgirl.

The Social Side

In addition to the items of medical interest, the day also included a social programme which culminated in a most excellent dinner, at which the President expressed the great appreciation that members of the Association felt for the prodigious amount of work Dr. Russell Grant and his staff had performed in organizing a visit so full of interest and pleasure. Dr. Bauwens said that he could not be alone in feeling proud to belong to a specialty which could provide among its many facets a service of the like seen that day.

D. R. L. Newton

CANADIAN ASSOCIATION OF PHYSICAL MEDICINE AND REHABILITATION

ANNUAL MEETING

THE Fifth Annual Meeting of the Canadian Association of Physical Medicine and Rehabilitation was held in Toronto, Ontario, on June 21 and 22, 1957.

At the General Business Meeting the following officers were elected: President—Dr. G. Gingras; Vice-President—Dr. John S. Crawford; Secretary—Dr. M. Mongeau; Treasurer—Dr. Talmadge E. Hunt; Chairman, Exhibits and Recreation Programme—Dr. Maurice Delage.

The Sixth Annual Meeting of the Association will be held in Quebec City on June 12, 13, and 14, 1958.

CHARTERED SOCIETY OF PHYSIOTHERAPY

ANNUAL CONGRESS

THE Annual Congress of the Chartered Society of Physiotherapy was held from September 19 to 21, 1957. The programme of lectures included "Arterial Surgery" (Professor C. G. Rob), "The Place of the Physiotherapist in Psychological Medicine" (Dr. Noel G. Harris), "The 'So-Called' Collagen Diseases" (Professor R. E. Tunbridge), and "The Development of Reconstructive Surgery" (Mr. M. H. Kinmonth). The Founders' Lecture, "Read, Mark, Learn", was delivered by Professor W. R. Spurrell.

The Annual Congress Dinner was held at the Park Lane Hotel. In proposing the toast of the Society, Dame Enid Russell-Smith stressed the importance of the team approach for success in the National Health Service. In reply Miss Sybil Evans said that the Society was the largest of the medical auxiliary bodies, and had as its objective the raising of the standard of care of the patient. The health of the guests was proposed by Sir Cecil Wakeley, and the response was given by Lieut.-General Sir Alexander Drummond, Director-General of Army Medical Services.

WE regret to announce the sudden death, on January 25 last, of Dr. C. J. S. O'MALLEY, C.B.E., former medical director of Garston Manor Medical Rehabilitation Centre. An obituary will appear in our next issue.

REVIEWS OF BOOKS

SPASTICS IN CHEYNE WALK. By Dr. Joan Saunders and Miss Marjorie Napier. *Pp. 156. 20s. London: Pitman Medical Publishing Co. 1957.*

There are four main parts to this book. The first describes the centre for the treatment of young spastics opened in Chelsea in 1955, and outlines its origin, aims, finances, layout, and staffing. Details of a typical day's programme are also given. The second part briefly sets out the extent of the cerebral palsy problem in this country, and describes what is being attempted at the present time by various interested bodies. The third part gives reports, compiled by different members of the staff, on the first eighteen months' work; included are contributions by the almoner, clinical psychologist, physiotherapist, speech therapist, occupational therapist, school-teachers, the house mothers, the secretary, and the physician. The fourth part comprises appendices in which much useful information concerning the national facilities for treating cerebral palsy is collected.

This book will have a wide appeal to medical administrators, to therapists, and to those members of the medical profession whose work brings them in contact with the many problems associated with cerebral palsy. The chapter by the physician-neurologist is particularly refreshing, for the extent of the neurological problem has rarely been better surveyed, and many possible and interesting lines of research are suggested. With humility he suggests that apart from his positive functions he has an important negative one—namely, not to interfere with empirical methods of treatment unless and until he has something better to substitute.

The book emphasizes the necessity for teamwork in dealing with cerebral palsy, and demonstrates that it is possible for the National Health Service to co-operate in a venture which is not altogether under its control. The size of the effort needed to cope adequately with the treatment and training of a limited number of children with cerebral palsy provides food for thought. CHARLES ARNOTT

A TEXTBOOK OF MEDICAL CONDITIONS FOR PHYSIOTHERAPISTS. By Joan E. Cash. *Pp. 387. 25s. London: Faber & Faber Ltd. 1957.*

The subject of this textbook is bound to present special difficulties. It is, as the title declares, a textbook of medical conditions with special reference to a limited group of diseases—the criterion for selection not being based on any aetiological, pathological, or other basic aspect, but simply that the diseases concerned are those which a physiotherapist, with her special therapeutic techniques, is likely to encounter. In addition the book is written by someone who has not undergone a conventional medical training and whose experience (and training) in scientific disciplines has been, of necessity, influenced by similar factors. Miss Cash has obviously overcome all these difficulties by keeping closely to her brief. She has set out to describe as fully as necessary the groups of diseases which form the bulk of medical material reaching a physiotherapist.

It is characteristic of modern teaching of physiotherapy that the first chapter deals with the pathological changes of inflammation, atrophy, hypertrophy, oedema, etc., and their relation to methods of physical treatment. Rheumatic diseases are characterized as rheumatic affections, this having perhaps a faintly old-fashioned ring somewhat out of tune with modern jargon. Not everyone would think that menopausal or climacteric arthritis is a justifiable diagnosis, and she has to face the difficulty that

modern thought is fluid in many aspects. She has to choose a reasonably dogmatic line so that she can lay down a practicable programme of treatment for the physiotherapist to follow, and very sound it all is. It is a pity that spondylosis is included in the chapter on spondylitis, and again that, in the chapter on neuritis, osteoarthritis of the cervical spine is referred to as cervical spondylitis. The section on neuritis may be a little longer than is justified. The diagram of a protruded lumbar intervertebral disk shows the cord still to be present, which, whilst illustrating the possibility of cord involvement at other levels, is hardly correct for the common site in the lower lumbar region. Some details of the surgery of the heart are presumably necessary for an understanding of the post-operative rehabilitation of these cases, and are certainly of interest, but perhaps academic rather than practical. However, these are minor criticisms, and Miss Cash is to be congratulated on undertaking a formidable task, beset with many pitfalls, with real skill and wide knowledge. This would be a book of value not only to physiotherapists, both for reading and reference, but also to those of us who have physiotherapy training schools associated with our departments. It certainly indicates the very high standard of training which physiotherapists receive in this country to-day.

R. M. MASON

NOTICE

BRITISH OLYMPIC ASSOCIATION

EVERY fourth year Great Britain must send its team, made up of representatives of many sports, to the Olympic Games, wherever they may be held, close at hand or many thousands of miles away. This is an operation of some magnitude, entailing as it does the clothing and equipping of the team and their transportation.

The Olympic Games constitute international sport at its best. Representatives of more than sixty countries live together in the Olympic villages in comradeship and concord, and compete together in friendly rivalry and understanding.

The British Olympic Association invites all men and women who are interested to assist it in its work and to become members. The Association needs a host of well-wishers to give it their support and encouragement, as well as to provide a firm financial basis on which to work.

The annual subscription is one guinea, the period of membership being from January 1 to December 31 in each year. Those members joining after June in any year will pay one guinea, but their subscription the following year will be half a guinea should they so wish, reverting thereafter to one guinea. The life subscription is ten guineas. Members are entitled to the following privileges: (*a*) A free copy of the British Olympic Association's Official Report of each Olympic Games meeting. (*b*) Advance information regarding functions, dinners, etc., organized by the Association; and advance facilities, where they exist, for the purchase of tickets and accommodation for the Olympic Games. (*c*) To purchase and wear the member's tie and badge. (*d*) To elect two representatives of the members to serve on the British Olympic Council.

Inquiries should be made to the General Secretary, British Olympic Association, 95 Mount Street, London, W.1.

ABSTRACTS OF THE LITERATURE

Empire Rheumatism Council Multi-centre Controlled Trial of Cortisone Acetate and Acetylsalicylic Acid in the Long-term Treatment of Rheumatoid Arthritis. Result of Three Years' Treatment. *Ann. rheum. Dis.*, 1957, **16**, 277.

Despite the loss of 47 patients from the trial series of 100 patients during three years, it was concluded that results of treatment with cortisone acetate and acetylsalicylic acid were similar. Both groups of patients showed clinical improvement at the end of three years' treatment, though radiological deterioration was evident. S. MATTINGLY

Rheumatoid Arthritis Presenting as Tenosynovitis. J. H. JACOBS, E. V. HESS, and I. P. BESWICK. *J. Bone Jt Surg.*, 1957, **39B**, 288.

Three cases are reported from the Royal Free Hospital, London, in which tenosynovitis of the hands and wrists was the primary manifestation of rheumatoid arthritis. Joint involvement became apparent 18, 14, and 4 months after the tenosynovitis.

Biopsies from these three cases showed "hyperaemia and oedema of the tendon sheaths, proliferation of the synovial lining cells with exudation of fibrin upon synovial surfaces, and diffuse infiltration of the tissues with lymphocytes and plasma cells, together with the formation of circumscribed lymphoid nodules".

P. J. R. NICHOLS

Primary Instability of Lumbar Vertebrae as a Common Cause of Low Back Pain. F. P. MORGAN and T. KING. *J. Bone Jt Surg.*, 1957, **39B**, 6.

The object of this paper from Melbourne is to show that primary instability of lumbar vertebrae (pseudo-spondylolisthesis) is perhaps the commonest cause of low back pain. Secondary instability such as that accompanying nuclear prolapse, osteoarthritis, or neural arch defect is excluded from the discussion. Instability is demonstrated by radiographs taken in flexion and extension; it is commonest between L4 and 5, and rare between L5 and S1 (because the apophysial joints resist anterior sliding). The pathological findings, radiographic examination, and clinical features are discussed. Operative treatment is regarded as the last resort for selected individuals.

A consecutive series of 500 patients with lumbosacral pain is described; of these, 143 (28·6%) were found to have uncomplicated instability of lumbar vertebrae and 111 (22·2%) gross disk degeneration. Forty of the patients were operated on, including 17 with uncomplicated instability of lumbar vertebrae.

The results of laminectomy plus bone graft are detailed for 30 cases of unstable vertebrae. Seven of these patients had previously been operated on for prolapsed disk. Of the 30 patients, 21 (70%) returned to work pain-free and a further 4 (13·3%) returned to work improved.

P. J. R. NICHOLS

Surgical Treatment of Low Back Pain and Sciatica. K. KRISTIANSEN and N. EIE. *J. Oslo Cy Hosp.*, 1957, **7**, 133.

This paper from the Surgical and Neurosurgical Departments of Ullevål Hospital, Oslo, describes the results in 236 patients operated upon for low back pain between 1950 and 1956. Symptoms, signs, and indications for operation are discussed. The authors regard myelography as indispensable, stating that the

600 myelographies performed in their units have produced no harmful effects. Operative technique, which includes spinal fusion done by the Smith-Petersen method, and post-operative treatment are described.

The follow-up is grouped under 177 cases of prolapsed intervertebral disk, 46 cases of osteochondrosis, 9 cases of spondylolisthesis, and 4 cases of spinal arachnoiditis.

The authors conclude that surgical treatment of the low-back-pain–sciatica syndrome must be regarded as very valuable in severe cases. In their hands combined removal of the protrusion and subsequent spinal fusion have produced good results. Follow-up studies suggest strongly that these good results are lasting.

D. C. ARNOTT

Discussion on the Clinical and Radiological Aspects of Sacro-iliac Disease. *Proc. roy. Soc. Med.*, 1957, **50**, 847.

Three papers read by Dr. M. Thompson, Dr. D. R. L. Newton, and Dr. R. G. Grainger give a comprehensive account of clinical and radiological findings in ankylosing spondylitis and the differential diagnosis in disease of the sacro-iliac joints. Early symptoms are stressed in the diagnosis of ankylosing spondylitis and tests for sacro-iliac dysfunction evaluated.

S. MATTINGLY

Internal Derangements of the Knee Joint in Miners. J. B. ATKINS. *Brit. J. industr. Med.*, 1957, **14**, 121.

Review of 102 Cases of Beat Conditions of the Knee. W. B. ROANTREE. *Brit. J. industr. Med.*, 1957, **14**, 253.

The first of these papers presents a detailed study of 100 cases of internal derangement of the knee treated at a miners' residential unit in South Wales. Eighty-two of the initial injuries, and 33 of 40 subsequent injuries, occurred in the mines. The causes of injury are analysed and discussed. Slipping and tripping, either at the coal face or on roadways to and from the coal face, are given as the commonest causes of internal derangements of the knee.

The second paper deals with the lesions which are primarily due to kneeling and crawling at the coal face. "Beat" knee is usually either an inflammatory lesion (a folliculitis or a subcutaneous cellulitis) or a pressure lesion, usually a bursitis. The commonest form of bursitis involves the prepatellar bursa. Aspiration fluid from affected bursae is always blood-stained. Treatment consists primarily in early and adequate prevention of kneeling. The infections respond to penicillin, and refractory bursitis may require excision of the bursa. The author notes the lack of standardized schemes of treatment appropriate to such inflammatory and pressure lesions. Cushioned knee-pads do not seem to afford adequate protection.

These two papers are an interesting excursion into realms where industrial medicine and physical medicine should be closely associated.

P. J. R. NICHOLS

Nerve Repair in Civil Practice: Results of Treatment of Median and Ulnar Nerve Lesions. O. R. NICHOLSON and H. J. SEDDON. *Brit. med. J.*, 1957, **2**, 1065.

This paper from the Institute of Orthopaedics contains an analysis of the results of 163 ulnar and 142 median nerve repairs in 277 patients. These were cases of civil injury treated at the Oxford Nerve Injuries Centre from 1941 until 1948, and patients treated at the Royal National Orthopaedic Hospital from 1948 until the end of 1954. A number of cases of

primary suture were referred from other centres because of poor recovery. The method of assessment was the same as that used in the work described in the report of the Nerve Injuries Committee of the Medical Research Council published in 1954, which was concerned mainly with wartime injuries consisting chiefly of maximal lesions. In the present series distal injuries predominate.

After injuries at the wrist, two out of three sutures of the median nerve were followed by useful motor recovery, and four out of five by good sensory recovery. The ulnar nerve sutures gave good motor and sensory recovery in four out of five patients. These results were significantly better than the 1954 series for ulnar sensory recovery and for median motor recovery.

The factors influencing recovery considered in the 1954 report were the effect of the level of the injury, delay in suture, and the extent of the gap. In this report the patient's age, mobilization of the nerve, histological grading, primary suture, and associated tendon injuries are also considered.

Primary nerve suture proved an unreliable operation, and no apparent harm resulted from delay of up to six months between injury and nerve suture. Secondary suture of the nerve is particularly advocated for injuries at the wrist with associated damage to tendons, which should be repaired at the time of the injury.

P. J. R. NICHOLS

Rheumatic Fever in the Aged. H. KJÖRSTAD. *Acta med. scand.*, 1957, **158**, 337.

The author notes a considerable change in age distribution in the incidence of rheumatic fever at Ullevål Hospital, Oslo, as well as a decrease in incidence. The symptomatology and clinical course in 46 patients over 50 years of age with a diagnosis of rheumatic fever are reviewed. Doubt is thrown on this diagnosis in many of the cases, and it is pointed out that the clinical picture is often atypical. The illness is often protracted, with low fever, moderate joint symptoms, and a low incidence of cardiac damage. The differential diagnosis from rheumatoid arthritis is often difficult.

G. O. STOREY

The Problem of the Aged Amputee. M. WARREN. *Post-Grad. med. J.*, 1957, **33**, 436.

The special problems which arise in the treatment of the aged amputee are reviewed, as well as the general principles which may be applied to all amputees. In a large number of elderly persons it is unwise to abandon a pylon, for a prosthesis often proves impracticable. The patient should be seen before the amputation, and education should aim at full independence with the aid of sticks, gadgets, etc.

G. O. STOREY

Drop-foot Appliance with Concealed Spring. W. H. TUCK. *J. Bone Jt Surg.*, 1957, **39B**, 335.

This paper describes the outcome of four years' study in the workshops of the Royal National Orthopaedic Hospital, London. The result is a toe-raising apparatus which is invisible externally, the power unit concealed in the heel of the shoe. It is easily made and easily fitted.

P. J. R. NICHOLS